

**Wisconsin Highway Research Program
Request for Proposal for**

**Investigation and Development of a Non-Destructive System to Evaluate
Wisconsin Asphalt Pavement Compaction Efforts and Properties**

**Proposals must be submitted
no later than
Wednesday, March 3, 2010**

**For further information regarding this RFP
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Wednesday, January 27th, 2010

Researcher Proposal Preparation Guidelines

WHRP Proposal Guidelines are available on the WHRP website (<http://www.whrp.org/rfps-and-guidelines.html?current=three&sub=none>). Please refer to these instructions in preparation of your response.

I. Background and Problem Statement

During the mid-1990's, WisDOT specifications shifted from the primary use of cored samples to a non-destructive measurement of asphalt pavement density. While the current system has served to maintain a level of performance, questions and concerns have been raised surrounding increased variability when attempting to properly evaluate: a) the influx of new materials going into pavements, b) a change in focus on pavement textures, c) rising construction zone safety issues (related to trying to decrease the amount of time and number of personnel needed to occupy the zone), and d) joint constructability and acceptance, all suggesting an opportunity to re-evaluate and enhance the current system.

Presently, WisDOT employs the use of nuclear density gauges in its Quality Management and Acceptance Programs providing rapid density readings and allowing non-destructive pavement density evaluation on site (refer SS 460.3.3 and CMM Sec.8 <http://roadwaystandards.dot.wi.gov/standards/cmm/index.htm>). Recent technological advancements indicate potential for developing a system capable of collecting an increased number of diverse measurements, efficient data report out, off site data retrieval, and real-time reaction benefits during construction without also incurring added difficulties associated with procuring radioactive materials licenses, special equipment handling, and operator radiation exposure.

While this research project should focus on investigating influential supplemental testing to aid in the evaluation of current density measurements, it should also explore additional value gained by pursuing other measurable properties relating compaction efforts to potential MEPDG inputs and ultimately the final pavement performance.

II. Objectives

- a) Assess current system for accuracy and appropriateness (in associating the effectiveness of compaction efforts, materials being used, and product function).
- b) Develop a comprehensive compaction evaluation system sensitive to changes in materials, multiple pavement textures, differing construction techniques, and variable paving conditions.
- c) Define likely enhancements related to resultant pavement performance (application specific) or identify service life concerns, if any.

III. Scope of Work

- a) Work Plan Tasks will include but are not limited to:
 - i) Literature search summarizing current practice related to compaction target field control and field acceptance procedures. Include a review of WHRP study 0092-05-10 (http://www.whrp.org/research-areas/flex/flex_0092-05-10.html)
 - ii) Theorize and define enhanced compaction evaluation system (including testing protocols, equipment needs, and procedures).
 - iii) Design, and submit for approval, a field experiment to collect necessary samples and related compaction data from actual projects to provide support or disclaimer in comparing or transitioning to a newer evaluation system.

- iv) Conduct the approved field experiment.
- v) Complete a statistical analysis of all collected data.
- vi) Develop final report containing conclusions and recommendations for improvements to current specifications (affecting production control and department acceptance procedures).
- b) WisDOT and/or Technical Oversight Committee (TOC) Contribution: 80 hours
- c) Requirements for Laboratory/Technician Certifications: HTCP Nuc-Density Technician certification is required for any intended nuclear gage testing on WisDOT projects
- d) Required travel to fulfill TOC Obligations: 1 on-site meeting

IV. Specific Results, Findings, Tools, etc. (Deliverables)

- a) Testing Protocols (inclusive of any equipment modifications or required tools)
- b) Written guidance for field operations (inclusive of visual representations) affecting:
 - i) Production control actions (and corrective reactions).
 - ii) Department acceptance methods (could describe, but not limited to, use of additional data to enhance understanding of current density measurements).
- c) Reporting Requirements. 36 Hard Copies Delivered to WHRP by the contract end date.
- d) Presentation Requirements. The PI is to give a closeout presentation after submittal of the draft final report.

V. Budget and Time Frame

- a) Project Duration is intended to be 25 months for work plan Tasks with an additional 4 months for project close-out activities (October 2010 – March 2013).
 - i) Deadline for submittal of a Draft Final Report: mid-October 2012.
 - ii) Deadline for submittal of Final Report: January 31st 2013
- b) Project Budget: **\$120,000**.
- c) Matching funds will **not** be considered in the proposal evaluation process.

VI. Implementation

- a) General areas of specifications and practices that the research has potential to impact:
 - i) Specifications: **SS 460.3.3**
 - ii) Contract Administration Guidance: **CMM**
- b) Researcher is expected to communicate the following:
 - i) Potential changes in practice.
 - ii) Benefits in terms of performance and cost savings.
 - iii) Tools or additional equipment to facilitate implementation (inclusive of suggested training).